



January 26, 1995

Mr. David Song
Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Way, Building 101
San Bruno, CA 94066-2402

**Subject: History of Radiological Investigations and
Status of Potentially Radioactive Investigation-Derived Wastes (IDW)
Stored in Building 810 at Hunters Point Annex (HPA)
CLEAN Contract No. N62474-88-D-5086, Contract Task Order No. 155 and 285**

Dear Mr. Song:

Since you will be assisting Mr. Michael McClelland with CTOs 155 and 285, I am providing you with a summary of radiological investigations at Hunters Point Annex (HPA) and the history surrounding *potentially* radioactive investigation-derived wastes (IDW) stored in building 810 there. I am also enclosing two reports by the U.S. Environmental Protection Agency (EPA) of petrographic analysis and six letters regarding waste storage and minimization, radiation survey techniques, and analytical results for the IDW.

BACKGROUND OF RADIOLOGICAL INVESTIGATIONS AT HPA

Radiation investigations at HPA are being performed in three phases. Phase I activities, under CTO 155, included high-volume air sampling for radioactive particulates and the Surface Confirmation Radiation Survey (SCRS). The SCRS consisted of investigations of surface radioactivity within Parcel E and Parcel B sites at HPA. Parcel E radiation sites are the Industrial Landfill (IR-01) and the Bay Fill Area (IR-02). Parcel B sites are the Submarine Base Area (IR-07) and the Waste Oil Disposal Area (IR-18).

PRC Environmental Management (PRC) implemented the SCRS during phase I, in 1991, after radioactive material was found in a trench excavation in IR-02. A survey plan for the SCRS was developed to identify areas in HPA landfills that contained radioactive material. The SCRS investigation was conducted in IR-01, IR-02, IR-07, and IR-18. The SCRS was performed to detect elevated gamma activity due to radioactivity from radium-226 (²²⁶Ra) and from operations associated with the Naval Radiological Defense Laboratory (NRDL). The SCRS combined the systematic screening of industrial landfill areas, using surface gamma radiation surveys, with soil sample analysis, soil radon flux measurements, groundwater analysis, downwell gamma radiation logging,

Mr. Song
January 26, 1995
Page 2

and cursory radiation surveys of selected buildings and sites. Phase I results are contained in the SCRS draft report (PRC 1992).

Phase II, also under CTO 155, implemented SCRS recommendations to investigate subsurface radioactivity in the landfills in Parcel E. These recommendations also include the investigation of the extent and radiological content of gamma-emitting soils in IR-07 and IR-18, suspected to contain elevated amounts of naturally occurring radioactive material (NORM). The results of phase II are contained in the Results of Subsurface Radiation Investigation in Parcels B and E, preliminary draft report (PRC 1995).

Phase III of the investigation, under CTO 285, began in the winter of 1994 and will provide the radiological survey of the former NRDL and formerly used defense (FUD) sites, complete the surface gamma survey of IR-02 landfill areas that were inaccessible during the SCRS, and investigate the radiological content of tidal and intertidal zones not surveyed during an EPA radiological survey (EPA 1989).

Phase I Radiation Investigation Results

Since ^{226}Ra had been identified in soils at IR-01 and IR-02, high-volume air sampling was performed at HPA to establish the concentration of airborne radioactive particulates in the air at the facility and nearby areas. Sampling was conducted to determine if airborne alpha or beta activity exceeded health and safety limits. The air sample filters were analyzed for gross alpha and beta activity to establish background concentrations of long-lived radioactive airborne alpha- and beta-emitting particulates associated with ^{226}Ra . Sampling was conducted during activities that did not disturb the soil or cause resuspension of dust. Results indicated that concentrations of gross alpha- and beta-emitting airborne particulates at HPA were similar to background levels normally found in the San Francisco Bay Area.

IR-01, IR-02, IR-07, and IR-18 were surveyed for elevated gamma activity. Historical accounts of activities in IR-01 and IR-02 indicate that, during routine maintenance operations on Navy ships and submarines, unserviceable radium-containing devices were removed and disposed of in the IR-01 and IR-02 landfills. These radium-containing devices were mainly instrument dials and illuminators. Although ^{226}Ra emits primarily alpha radiation, such devices can be located by their gamma-emitting decay progeny (daughters). In typical buried devices that have an activity of approximately 1 microcurie (μCi), the gamma radiation emitted by the daughters can usually be detected to a depth of approximately 1 foot.

The phase I investigations identified over 300 radium-containing devices in surface soils of the IR-02 landfill, within a limited area of approximately 36,000 square feet. Three devices were identified in IR-01. Soils surveyed in IR-07 and IR-18 exhibited elevated gamma count rates. Surface soil samples that were collected in IR-18 contained concentrations of ^{226}Ra that are not above normally expected background levels. One soil sample within IR-07 contained 5.4 picocuries per gram (pCi/g) ^{226}Ra , which is above expected background levels.

The results of the SCRS showed that ^{226}Ra -containing materials in surface soils are present in concentrations above normally expected background levels in IR-01, IR-02, IR-07, and IR-18. The results also indicated that no mixed fission products are present in soils sampled at IR-01, IR-02, IR-

Mr. Song
January 26, 1995
Page 3

03, IR-07, and IR-18. Finally, the results revealed that other than ^{226}Ra , all radioisotopes in soil samples are within expected background levels at all sites.

Phase II Radiation Investigation Results

Forty-two test pits and three trenches were excavated during phase II. Results indicate that materials containing radium-226 (^{226}Ra) associated with past disposal of illuminators, ship instruments, and dials are below the surface within an area in IR-02 approximately 400 feet long by 250 feet wide. Within this area, approximately 111 discrete gamma emitting point sources, of approximately 1 microcurie each, were identified to a maximum depth of 9 feet.

The volume of soil in IR-02 that contains these individual point sources was calculated to be approximately 5,500 cubic yards. Based on trenching data, five point sources, with an average activity of one microcurie each, are in each 10 cubic yards of soil. Based on this data approximately 2,800 point sources with an estimated aggregate ^{226}Ra activity of approximately 2.8 millicuries may be present in the landfill. No subsurface gamma-emitting point source materials were found within IR-01, IR-07, IR-14, and IR-18.

Test pits excavated in IR-07 and IR-18 revealed soils that exhibit gamma count rates approximately twice that of expected background. Preliminary results indicate that soils contain NORM, including ^{226}Ra at levels slightly above expected background. Further investigation is needed to determine if these soils are imported or native fill. If the soils are imported, additional action at these sites may be requested by regulatory agencies. The position of the Navy's Radiological Affairs Support Office (RASO) and PRC is that the soils at the site contain NORM at essentially background levels, do not pose a radiation exposure hazard, and do not require remediation.

POTENTIALLY RADIOACTIVE IDW STORED IN BUILDING 810

Potentially radioactive IDW stored in building 810 was generated during soil boring activities within IR-01, IR-02, IR-07, and IR-18 that were conducted from 1990 through 1992 under CTOs 057, 106, 142, and 196. The IDW was considered to be *potentially* radioactive since the phase I radiation investigation identified elevated gamma radiation in IR-01, IR-02, IR-07, and IR-18. As the IDW was collected it was to be screened, using radiation detection equipment, to assess it for elevated radioactivity. Unfortunately, because of technical limitations and equipment failures, the subcontractor that oversaw soil boring and well installation could not provide substantive radiological data. Therefore, all IDW collected from IR-01, IR-02, IR-07, and IR-18 during the period from 1990 to 1992 was held in building 810 for radiological evaluation.

When PRC identified the IDW as potentially radioactive, we alerted Engineering Field Activity West (EFA WEST), who contacted RASO. RASO then contracted Chem-Nuclear, a radiological contractor prequalified by the U.S. Army Armament Munitions and Chemical Command, Rock Island, Maryland (AMCCOM), to perform a radiological survey of the IDW stored in building 810.

On October 18, 1993, Chem-Nuclear surveyed the IDW. They produced a report, dated January 21, 1994, indicating that analyzed soil collected from IDW in drums contained, "...no radium or strontium activity significantly above background." Chem-Nuclear recommended that an on-site

Mr. Song
January 26, 1995
Page 4

counting system be set up to quantitatively screen drums and that soil from 100 drums be sampled and analyzed to "...quantify the amount of radioactivity contained in a representative cross-section...." of the drums. The report was sent to EFA WEST from RASO by facsimile on December 6, 1994.

During the period between October 18, 1994, and the present, PRC has sent several letters to EFA WEST concerning the radiological IDW stored in building 810 and other issues. The latest, dated December 15, 1994, detailed reducing the number of drums of IDW that may be considered for radiological characterization. The reduction is based on recent information presented in the Subsurface Radiation Investigation in Parcels B and E, preliminary draft report (PRC 1995), and the report of petrographic analysis of soils in Parcel B (EPA 1994a) and Parcel E (EPA 1994b). Justification for this reduction and a list of drums is provided in the December 15, 1994, letter to EFA WEST.

On the same day, at the request of EFA WEST to expedite Chem-Nuclear's mobilization to HPA for sampling and analysis of drummed IDW, PRC sent the December 15, 1994 letter to RASO by facsimile. On January 3, 1995, RASO contacted EFA WEST and acknowledged receipt of the letter but did not take action because they needed an official cover letter request from EFA WEST to accompany it. To the best of our knowledge, a cover letter has not yet been sent.

CURRENT IDW SITUATION

At this time, the low-level radioactive waste (LLRW) storage container has been moved from its previous location in building 414 to building 130. The LLRW storage contains *known* radioactive material. The LLRW consists of one partially filled drum of radium-containing materials from investigations in landfill areas during phase I and phase II and four drums of soil samples returned from an analytical laboratory. Some of the samples contain significant amounts of radium. A safe is also in the storage container. The safe has a dial with "radium" painted on it.

Building 810 is to be upgraded to comply with current IDW storage requirements. Because of the upgrade work, *potentially* radioactive IDW in the building will need to be moved to building 130. If, as recommended in the December 15 letter, we are able to reduce the number of drums of IDW that will need radiological characterization, we will reduce the number of drums to be moved. Drums that do not need radiological characterization can then be disposed of through normal procedures. This will alleviate the need to dispose of all the IDW as radioactive waste and reduces the number of drums to be moved to building 130. If we can do this, the cost savings to the Navy will be substantial.

I welcome the opportunity to brief you on these or any other radiation issues at your convenience. If you have any questions, please call me at (415) 222-8284 or the project manager, David Preston, at (415) 222-8285.

Sincerely,



David Martinez
Radiation Task Manager

Mr. Song
January 26, 1995
Page 5

Enclosures (8)

- (1) Letter from PRC to Michael McClelland, EFA WEST. Radiological Survey of Investigation-Derived Waste by Chem Nuclear. November 12, 1993.
- (2) Letter from Chem-Nuclear to U.S. Army AMCCOM. Report on Phase I, Naval Station Treasure Island, DAAA09-92-G-0006/A0034. January 21, 1994. (Faxed to EFA WEST on December 6, 1994.)
- (3) Letter from PRC to William Radzevich, EFA WEST. Radiation Screening and Disposal of Investigation-Derived Waste, OU I and OU IV at Hunters Point Annex. February 14, 1994.
- (4) Letter from PRC to Michael McClelland, EFA WEST. Request for Information Regarding Relocation of Low Level Radioactive Waste (LLRW) Storage Bin in Building 414, Hunters Point Annex. November 10, 1994.
- (5) Letter from PRC to Michael McClelland, EFA WEST. Radiation Screening for Disposal of Investigation-Derived Waste (IDW), Operable Units I and IV - Hunters Point Annex (HPA), San Francisco, California. November 28, 1994.
- (6) Letter from PRC to Michael McClelland, EFA WEST. Investigation-Derived Waste (IDW) Issues, Radiation Investigations at Hunters Point Annex (HPA). December 15, 1994.
- (7) Cover letter dated October 24, 1994, and report of petrographic analysis from EPA to Michael McClelland, EFA WEST. Hunters Point Annex - Parcel B. Radiological and chemical support center. August 30, 1994.
- (8) Cover letter dated October 24, 1994, and report of petrographic analysis from EPA to Michael McClelland, EFA WEST. Hunters Point Annex - Parcel E. Radiological and chemical support center. September 8, 1994.

cc: Michael McClelland, EFA WEST (w/o enclosures)
David Preston, PRC (w/o enclosures)
Jim Sickles, PRC (w/o enclosures)
file (w/ enclosures)

REFERENCES

- PRC Environmental Management, Inc (PRC). 1991. Preliminary Results of Ambient Airborne Gross Alpha and Beta Radioactivity at Naval Station Treasure Island, Hunters Point Annex, San Francisco, California.
- PRC. 1992. Surface Confirmation Radiation Survey. Draft report. Naval Station Treasure Island, Hunters Point Annex, San Francisco, California.
- PRC. 1995. Results of Subsurface Radiation Investigation in Parcels B and E. Preliminary draft report. Engineering Field Activity West, Naval Facilities Engineering Command, Hunters Point Annex, San Francisco, California.
- U.S. Environmental Protection Agency (EPA). 1989. Radiological Survey of the Mare Island Naval Shipyard, Alameda Naval Air Station, and Hunters Point Shipyard. EPA520/5-88-018. June.
- EPA. 1994a. Hunters Point Annex - Parcel B. Radiological and chemical support center. EPA contract No. 68D20155. Sanford Cohen and Associates.
- EPA. 1994b. Hunters Point Annex - Parcel E. Radiological and chemical support center. EPA contract No. 68D20155. Sanford Cohen and Associates.